PE4.20 New canned foods from meat of sea mammals 66.00

Andrey Lisitsyn (1) vniimp@inbox.ru, V Krylova( ), T Gustova ,
(1)The V.M. Gorbatov VNIIMP, Russian Federation

Abstract. To provide uninterrupted adequate nutrition of citizens of Chuckotka peninsula, not depending on the navigation period, studies on acceptability of meat of sea mammals – walrus, bearded seal, akiba (ringed seal) - caught according to imposed quotas, for the production of canned products were carried out.
The necessary investigations of safety, including those on the presence of polychlorinated biphenyls, helminthes in muscle tissue, have shown parasites free cleanness and compliance of the raw materials with the requirements of SanPin 2.3.2.1078-01 "Hygiene requirements of safety and food value of food products".
Chemical composition of meat raw materials as well as their amino acid and fatty acid composition has been determined. It is found that the meat of studied animals has a high content of protein, varying in the muscle tissue from 20% to 24.4%. Amino acid composition had a higher content of leucine (8.1 – 8.8 g/100 g of protein) and lysine (9,9 – 10.5 g/100 g of protein) in relation to the requirements of FAO/WHO.
The content of fat in meat samples varies from 15.4% to 21.7% and depends upon the species of sea mammals and season of their catch. Correlation ω6 : ω3 in the studied raw materials approaches the optimum one, i.e. 1 : 8-10.
Special preliminary treatment of raw materials to remove blood and water-soluble extractive substances from the tissue, imparting specific odor and flavor to them, has been developed.
A processing technology of canned foods in pieces from the meat of sea mammals has been developed. The products were highly appreciated by citizens of Chuckotka.

A.B.Lisitsyn, is with V.M.Gorbatov All-Russian meat Research Institute, Director, 109316, Moscow, Talalikhina 26, Russia
V.B.Krylova, is with the V.M.Gorbatov All-Russian meat Research Institute, Chief of Laboratory of Canned meats products
T.V. Gustova, is with the V.M.Gorbatov All-Russian meat Research Institute

Key words: meat of sea mammals, food and biological value, canned foods, technology

I. INTRODUCTION

Historically, the organism of indigenous population of Chukotka peninsula in Russia is adapted to nutrition with proteins and fats of sea animals, and physiological requirement in this kind of food should be met all the time, even if European foods are available. Meat is consumed in raw, cooked, frozen or dried form. The meat of pinnipedians is known to be a source of high-quality protein, rich in easily digestible iron, mineral elements, vitamins A and D, possesses antioxidant properties, is effective in treatment of atherosclerosis, anemia, diseases of liver and gastro-intestinal tract.

Canned foods from this kind of meat have never been produced in Russia.. It should be noted that these animals are enlisted in Red Book of Russia, and fishing out of sea mammals is carried out according to quotas of fishing (shooting) of water bioresources of Far East basin. Within the interbranch program "Development of Chukotka settlements" on the coast of Bering sea, in the settlement Lorino, a shop for production of canned foods from meat of pinnipedian sea mammals was built.

At the same time Chukotka division of Russian Red Cross charged VNIIMP named after V.M. Gorbatov to start investigations of meat of sea animals (walruses, bearded seal, nerpa) and develop processing technology of canned foods from it.

II. OBJECTS AND METHODS OF INVESTIGATIONS

The objects of investigations were meat raw materials of sea animals – nerpa (akiba), walrus, bearded seal.
The investigations were carried out at the Testing Center of VNIIMP named after V.M.Gorbatov.
The methods of investigations:

- chemical composition of meat raw materials (moisture, fat, protein, ash) – according to state standard (GOST) 7636
- amino acid composition of proteins – by the method of ion-exchange chromatography on the basis of separation of amino acids mixture on amino acid analyzer "Eppendorf Biotronik LC-3000" (Germzny);
- fatty acid composition of lipids – by gas-liquid chromatography on gas chromatograph HP 6890.
- - Microbiological investigations – according to existing standard methods SanPiN 2.3.2.1078

III. RESULTS AND DISCUSSION

Taking into consideration that these animals are not grown in controlled conditions, but obtained by

catching in the nature, their contamination with parasites and, possibly, specific pathogenic microorganisms was of special concern. Results of the investigations confirmed compliance with the requirements of meat safety, including microbiological, toxicological and radiological tests. The requirements of SanPiN 2.3.21078 "Hygiene rules of safety and food value of foods" were also satisfied. Tests for trichinella did not reveal presence of larvae of helminthes and parasites; contamination of raw materials with organochloric compounds was absent.

It has been found that the meat of the studied animals has a high content of protein, varying in the muscle tissue from 20% to 24.4%, mass fraction of fat in meat samples – from 15.4% to 21.7% and depends upon the species of sea mammals and season of their catch.

It is important to emphasize, that by the sum of essential amino acids the meat of sea mammals exceeded the values, required by FAO/WHO: nerpa (akiba) by 20.0, walrus – by 18.9 and bearded seal – by 16.7%, respectively (Table). Amino acid composition of the studied species of meat featured a higher content of leucine (8,1 – 8.8 g/100 g of protein), lysine (9.9 - 10.5 g/100g of protein) and phenylalanine+tyrosine (7.5 – 7.7/100 g of protein).

Table

Essential amino acids	Content of amino acids, g/100g of protein			
	FAO/WHO	In meat of nerpa (akiba)	In meat of walrus	In meat of bearded seal
Isoleucine	4.0	4.38±0.02	4.32±0.02	4.32±0.02
Leucine	7.0	8.83±0,04	8.14±0,04	8.13±0.04
Lysine	5.5	10.31±0.05	10.53±0,05	9.91±0.04
Methionine + cystine:	3.5	3.2±0.01	3.42±0.01	3.53±0.01
Phenylalanine+tyrosine:	6.0	7.62±0.03	7.68±0.03	7.47±0.03
Threonine	4.0	3.74±0.01	3.88±0.01	3.95±0.01
Tryptophan	10	0.97±0.01	0.98±0.01	0.97±0.01
Valine	5.0	4.11±0.02	3.86±0.02	3.70±0.02
Sum of essential amino acids	36.0	43.19±1.32	42.83±2.02	42.01±1.62

An important index for nutrition is the ratio of fatty acids ω6:ω3 which in the studied raw materials approached the optimum one and was 1 : 8-10. The obtained data suggest about food and biological value of the raw materials from sea animals and good reasons for their use for production of canned foods for uninterrupted supply of high-quality foods to the population.

Special technological operations of preliminary treatment of the raw materials with the aim of removal of blood and water-soluble extractive substances, imparting specific odor and flavor to them, have been developed. For example, soaking of the raw materials in special solution with mustard.

Process technology for the production of canned foods " Stewed meat of sea mammals" in the assortment as follows: "Stewed meat of walrus", "Stewed meat of akiba", and "Stewed meat of bearded seal" has been developed by specialists of the laboratory. The canned meats differed by chemical composition: thus, "Stewed meat of walrus" was balanced over the content of fat and protein. The mass share of fat in final product was 12%, protein – 15%, calorie content – 168 kcal in 100 g of the product. Mass share of protein in the canned foods "Stewed meat of akiba" and "Stewed meat of bearded seal" was in the range 12-14%, fat – 32-45%. Final products were richer in calorie content – 344-453 kcal in 100 g of canned foods. The developments were approved by the Institute of nutrition of the Russian Academy of Medical Science.

The indigenous population who knows well the meat of walrus, nerpa and bearded seal, and food specialists have appreciated all kinds of products – canned foods from the meat of sea mammals. The taste of final products resembled much the traditional foods of indigenous population of Chuckotka. Tasting procedures took place in the Board of Agriculture and Foods of the Department of industrial and agricultural policy of Chuckotka, and also in the settlement Lorino with the participation of indigenous population. The opinion was expressed that canned foods from meat of sea animals will find demand of the indigenous population of Chukotka;, from all kinds of stewed meat they will prefer these kinds.

IV. CONCLUSION

Thus, the development of canned foods technology from the meat of sea mammals will allow uninterrupted supply of valuable products to indigenous population of Chuckotka Autonomous Okrug, not depending on the time of the period of navigation.